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Spectrographic analyses of insoluble-residue samples, Joplin 1° x 2° quadrangle, Kansas and Missouri: Drill hole nos. 71, 72, 73, and 74

By

John H. Bullock, Jr.* and Helen W. Folger*

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This report is preliminary and has not been reviewed for conformity with U.S. Geological Survey editorial standards and stratigraphic nomenclature. Any use of trade names is for descriptive purposes only and does not imply endorsement by the U.S. Geological Survey.

*U.S. Geological Survey, DFC, Box 25046, MS 973, Denver, CO 80225

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INTRODUCTION

Geochemical studies of the Joplin 1° x 2° quadrangle, Missouri and Kansas, were begun in 1983 as part of a multidisciplinary study of the quadrangle by the U.S. Geological Survey, the Missouri Division of Geology and Land Survey, and the Kansas Geological Survey. The purpose of the study was to assess the mineral resource potential of the area by integrated geologic, geochemical, and geophysical studies.

The geochemical work has been directed at the characterization of the sedimentary rocks in the quadrangle through spectrographic analyses of dilute-hydrochloric-acid insoluble-residue samples of whole rock from widely-spaced drill holes. Drill holes have been selected for study from the sample libraries of the Missouri Division of Geology and Land Survey and the Kansas Geological Survey (KGS). None of the holes are company confidential and none intersect economically significant mineralized ground.

The analytical results for drill hole no. 71 (Water District #3 - KGS), drill hole no. 72 (#1 Wells - KGS), drill hole no. 73 (#1 Reed - KGS), and drill hole no. 74 (#1 Atleberry - KGS) are given in this report. Drill hole no. 71 is located in sec. 17, T. 34 S., R. 24 E. in Cherokee County, Kansas; drill hole no. 72 is located in sec. 7, T. 34 S., R. 15 E. in Montgomery County, Kansas; drill hole no. 73 is located in sec. 7, T. 34 S., R. 21 E. in Labette County, Kansas; drill hole no.74 is located in sec. 22, T. 32 S., R. 19 E. in Labette County (fig.1). Data for the insoluble-residue samples from drill holes 71, 72, 73, and 74 are listed in tables 1, 2, 3, and 4, respectively. Well name, well number, township, range, and county allow for identification and location of files at the Kansas Geological Survey.

PREPARATION AND ANALYSIS OF SAMPLES

Insoluble residues were prepared by dissolving approximately 80 grams of crushed carbonate rock in repeated applications of 1:5 hydrochloric acid until the carbonate was removed. The samples were then filtered and dried overnight at 50°C.

The samples were pulverized to minus 140 mesh (0.105 mm) in a vertical grinder equipped with ceramic plates. Some insoluble-residue samples contained only a few milligrams of material, and these were hand ground with an agate mortar and pestle. A hand magnet was passed over the insoluble-residue samples before grinding to remove filings or chips of drill bit that might have been present.

Each sample was analyzed semiquantitatively for 31 elements using a six-step D.C.-arc optical-emission spectrographic method (Grimes and Marranzino, 1968).

The semiquantitative spectrographic values are reported as six steps per order of magnitude (1, 0.7, 0.5, 0.3, 0.2, and 0.15) and are approximate geometric midpoints of the concentration ranges. The precision is shown to be within one adjoining reporting interval on each side of the reported value 83 percent of the time and within two adjoining intervals on each side of the reported value 96 percent of the time (Motooka and Grimes, 1976).

The visual lower limits of determination for the 31 elements that were determined spectrographically for this report are as follows:

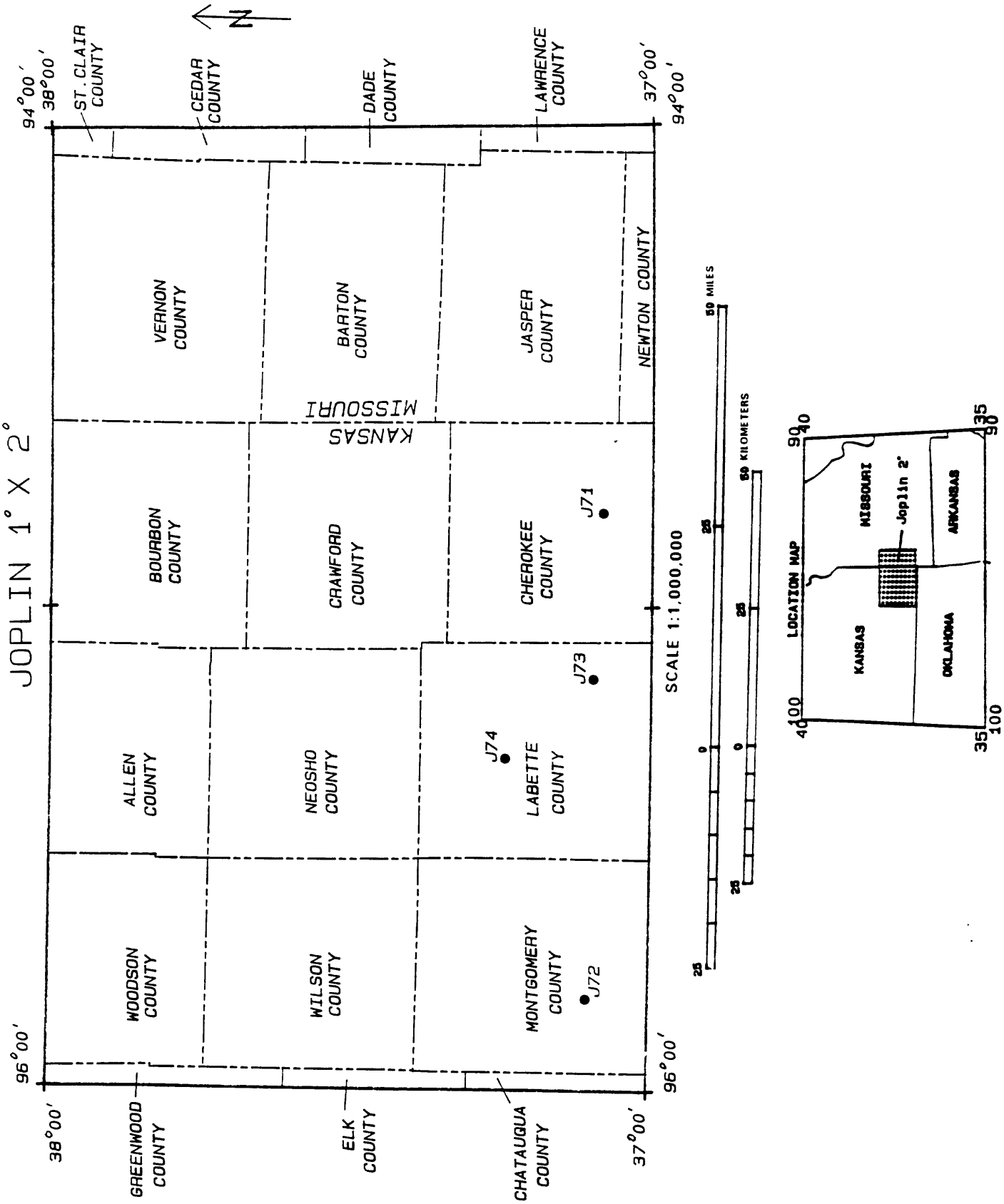

Figure 1. Locations of drill holes 71, 72, 73, and 74, Joplin 1° x 2° quadrangle, Missouri and Kansas.

For those given in percent:

Calcium	0.05
Iron	0.05
Magnesium	0.02
Titanium	0.002

For those given in ppm:

Antimony	100	Molybdenum	5
Arsenic	200	Nickel	5
Barium	20	Niobium	20
Beryllium	1	Scandium	5
Bismuth	10	Silver	0.5
Boron	10	Strontium	100
Cadmium	20	Thorium	100
Chromium	10	Tin	10
Cobalt	5	Tungsten	50
Copper	5	Vanadium	10
Gold	10	Yttrium	10
Lanthanum	20	Zinc	200
Lead	10	Zirconium	10
Manganese	10		

DESCRIPTION OF DATA TABLES

Each sample is identified by an eight-character code beginning with the letter J, signifying Joplin. The next number signifies the USGS drill-hole number. The letter R appears after the drill hole number and signifies insoluble residue. The next four digits identify the depth of the sample from the drill-hole collar. Most samples are composites of approximate 10-foot intervals, dependent upon the original sample intervals and upon the amount of sample material available for analysis.

The stratigraphic unit of the sample is identified by a coded number in the last column of tables 1 through 4. The code and formation names are as follows:

Code	Formation
20	Pennsylvanian Undifferentiated
31	Chattanooga Shale
40	Mississippian Undifferentiated
60	Ordovician Undifferentiated
78	Cambro - Ordovician Undifferentiated

EXPLANATION OF DATA

The columns in tables 1 through 4 have headings of sample, elements, and formation. The letter S over the columns signifies emission-spectrographic data.

Iron, magnesium, calcium, and titanium are reported in weight percent (%); all other elements are in parts per million. Other symbols shown on the tables are:

N = Not detected at the limit of determination;
< = Detected, but below the limit of determination shown; and
> = Greater than the limit of determination shown.

Because of the formatting used in the computer program that produced tables 1-4, some of the elements listed in these tables (Fe, Mg, Ca, Ti, Ag, and Be) may carry one or more nonsignificant zeros to the right of the significant digits. The analyst did not determine these elements to the accuracy suggested by the extra zeros.

RASS

Upon completion of all analytical work, the information from the samples is entered into a computer-based file called RASS (Rock Analysis Storage System). This RASS file contains both descriptive geological information and analytical data. Any or all of this information may be retrieved and placed in a standard form (STATPAC) for computerized statistical manipulation or publication (VanTrump and Miesch, 1977).

ACKNOWLEDGMENTS

The authors wish to thank the Kansas Geological Survey, Dr. Lee C. Gerhart, State Geologist, and his staff, for making these drill-hole samples available from their sample library.

REFERENCES

Grimes, D.J., and Marranzino, A.P., 1968, Direct-current arc and alternating-current spark emission spectrographic field methods for the semiquantitative analysis of geologic materials: U.S. Geological Survey Circular 591, 6 p.

Motooka, J.M., and Grimes, D.J., 1976, Analytical precision of one-sixth order semiquantitative spectrographic analyses: U.S. Geological Survey Circular 738, 25 p.

VanTrump, George, Jr., and Miesch, A.T., 1977, The U.S. Geological Survey RASS-STATPAC system for management and statistical reduction of geochemical data: Computers and Geosciences, v. 3, p. 475-488.

TABLE 1--SPECTROGRAPHIC ANALYSES OF INSOLUBLE-RESIDUE SAMPLES FROM DRILL HOLE NO. 71, JOPLIN 1 x 2 QUADRANGLE, MISSOURI AND KANSAS.

[N, not detected; <, detected but below the limit of determination shown; >, determined to be greater than the value shown.]

Sample	Latitude	Longitude	Fe-pct. s	Mg-pct. s	Ca-pct. s	Ti-pct. s	Mn-ppm s	Ag-ppm s	As-ppm s	Au-ppm s
J71R0650	37 4 57	94 48 27	.2	.2	.3	.05	10	N	N	N
J71R0670	37 4 57	94 48 27	.3	.5	.7	.03	10	N	N	N
J71R0690	37 4 57	94 48 27	.5	.1	.2	.1	10	N	N	N
J71R0810	37 4 57	94 48 27	1	.3	.15	.15	20	N	N	N
J71R0830	37 4 57	94 48 27	.15	.1	.15	.07	10	N	N	N
J71R0850	37 4 57	94 48 27	.1	.03	.05	.015	<10	N	N	N
J71R0870	37 4 57	94 48 27	.05	.02	.05	.01	<10	N	N	N
J71R0890	37 4 57	94 48 27	.5	.2	.05	.2	10	N	N	N
J71R0900	37 4 57	94 48 27	.2	.05	.05	.05	<10	N	N	N
J71R0910	37 4 57	94 48 27	.3	.15	.15	.1	10	N	N	N
J71R0920	37 4 57	94 48 27	1.5	.3	.1	.2	50	N	N	N
J71R0940	37 4 57	94 48 27	.5	.07	.05	.05	10	N	N	N
J71R0950	37 4 57	94 48 27	.5	.1	.3	.02	10	N	N	N
J71R0960	37 4 57	94 48 27	1	.15	.05	.1	20	N	N	N
J71R0970	37 4 57	94 48 27	5	.5	.2	.2	70	1	N	N
J71R0990	37 4 57	94 48 27	.7	.3	.2	.15	150	N	N	N
J71R1010	37 4 57	94 48 27	.3	.2	.2	.05	10	N	N	N
J71R1020	37 4 57	94 48 27	.05	.03	<.05	.02	N	N	N	N
J71R1030	37 4 57	94 48 27	.1	.05	<.05	.05	50	N	N	N

TABLE 1--SPECTROGRAPHIC ANALYSES OF INSOLUBLE-RESIDUE SAMPLES FROM DRILL HOLE NO. 71, JOPLIN 1 x 2 QUADRANGLE, MISSOURI AND KANSAS.--Continued

Sample	Pb-ppm s	Sb-ppm s	Sc-ppm s	Sn-ppm s	Sr-ppm s	V-ppm s	W-ppm s	Y-ppm s	Zn-ppm s	Zr-ppm s	Th-ppm s	Form#
J71R0650	N	N	N	N	N	<10	N	N	N	30	N	78
J71R0670	N	N	N	N	N	<10	N	N	N	20	N	78
J71R0690	N	N	N	N	N	10	N	N	N	200	N	78
J71R0810	N	N	N	N	N	50	N	N	N	50	N	78
J71R0830	N	N	N	N	N	10	N	N	N	15	N	78
J71R0850	N	N	N	N	N	N	N	N	N	N	N	78
J71R0870	N	N	N	N	N	N	N	N	N	N	N	78
J71R0890	N	N	N	N	N	30	N	N	N	100	N	78
J71R0900	N	N	N	N	N	N	N	N	N	10	N	78
J71R0910	N	N	N	N	N	20	N	N	N	20	N	78
J71R0920	15	N	N	N	N	50	70	N	N	70	N	78
J71R0940	N	N	N	N	N	N	N	N	N	15	N	78
J71R0950	N	N	N	N	N	N	N	N	N	N	N	78
J71R0960	N	N	N	N	N	30	N	N	N	30	N	78
J71R0970	70	N	N	N	N	70	N	N	N	100	N	78
J71R0990	N	N	N	N	N	30	N	N	N	70	N	78
J71R1010	N	N	N	N	N	15	N	N	N	20	N	78
J71R1020	N	N	N	N	N	N	N	N	N	50	N	78
J71R1030	N	N	N	N	N	N	N	N	N	100	N	78

Sample	B-ppm s	Ba-ppm s	Be-ppm s	Bi-ppm s	Cd-ppm s	Co-ppm s	Cr-ppm s	Cu-ppm s	La-ppm s	Mo-ppm s	Nb-ppm s	Ni-ppm s
J71R0650	70	70	N	N	N	N	N	15	N	N	N	5
J71R0670	100	50	N	N	N	N	N	5	N	N	N	5
J71R0690	70	200	N	N	N	N	N	20	N	15	N	10
J71R0810	100	100	2	N	N	5	10	20	N	N	N	15
J71R0830	100	100	N	N	N	N	N	5	N	N	N	N
J71R0850	70	50	N	N	N	N	N	<5	N	N	N	N
J71R0870	70	70	N	N	N	N	N	<5	N	N	N	N
J71R0890	100	150	1.5	N	N	N	20	15	N	50	N	10
J71R0900	50	50	N	N	N	N	N	7	N	N	N	5
J71R0910	50	70	N	N	N	N	N	7	N	N	N	7
J71R0920	70	150	1	N	N	10	20	50	N	5	N	20
J71R0940	50	50	N	N	N	N	N	7	N	15	N	5
J71R0950	50	70	N	N	N	N	N	7	N	<5	N	5
J71R0960	50	70	1	N	N	7	N	10	N	10	N	10
J71R0970	100	150	2	N	N	30	30	70	N	100	N	70
J71R0990	70	200	<1	N	N	5	10	10	N	N	N	15
J71R1010	70	50	N	N	N	N	N	5	N	N	N	5
J71R1020	20	70	N	N	N	N	N	N	N	N	N	N
J71R1030	20	30	N	N	N	N	N	N	N	N	N	N

TABLE 2--SPECTROGRAPHIC ANALYSES OF INSOLUBLE-RESIDUE SAMPLES FROM DRILL HOLE NO. 72, JOPLIN 1 x 2 QUADRANGLE, MISSOURI AND KANSAS.

[N, not detected; <, detected but below the limit of determination shown; >, determined to be greater than the value shown.]

Sample	Latitude	Longitude	Fe-pct. s	Mg-pct. s	Ca-pct. s	Ti-pct. s	Mn-ppm s	Ag-ppm s	As-ppm s	Au-ppm s
J72R1010	37 7 6	95 46 31	3	1	.1	.3	200	1	N	N
J72R1030	37 7 6	95 46 31	5	1	.1	.5	300	.7	N	N
J72R1070	37 7 6	95 46 31	5	.7	.05	.5	500	<.5	N	N
J72R1110	37 7 6	95 46 31	5	.7	.05	.7	300	<.5	N	N
J72R1130	37 7 6	95 46 31	5	1	<.05	.7	200	N	N	N
J72R1160	37 7 6	95 46 31	5	.7	<.05	.5	200	N	N	N
J72R1190	37 7 6	95 46 31	3	.7	<.05	.7	150	N	N	N
J72R1230	37 7 6	95 46 31	3	.5	<.05	1	150	N	N	N
J72R1270	37 7 6	95 46 31	5	1	.05	1	200	N	N	N
J72R1290	37 7 6	95 46 31	5	1	<.05	1	200	N	N	N
J72R1320	37 7 6	95 46 31	5	.7	<.05	1	200	N	N	N
J72R1360	37 7 6	95 46 31	5	.7	<.05	.7	200	N	N	N
J72R1390	37 7 6	95 46 31	5	.7	.07	1	200	N	N	N
J72R1410	37 7 6	95 46 31	5	.7	<.05	1	150	N	N	N
J72R1430	37 7 6	95 46 31	5	.7	<.05	1	200	N	N	N
J72R1460	37 7 6	95 46 31	5	.7	.05	1	300	N	N	N
J72R1500	37 7 6	95 46 31	2	.5	<.05	.5	100	N	N	N
J72R1530	37 7 6	95 46 31	2	.3	<.05	.5	70	N	N	N
J72R1560	37 7 6	95 46 31	2	.3	<.05	.3	70	N	N	N
J72R1610	37 7 6	95 46 31	2	.3	<.05	.3	50	N	N	N
J72R1660	37 7 6	95 46 31	.7	.1	<.05	.1	20	N	N	N
J72R1720	37 7 6	95 46 31	1.5	.2	.05	.2	50	N	N	N
J72R1760	37 7 6	95 46 31	3	.5	.05	.5	70	N	N	N
J72R1770	37 7 6	95 46 31	3	1	<.05	.5	150	N	N	N

Sample	B-ppm s	Ba-ppm s	Be-ppm s	Bi-ppm s	Cd-ppm s	Co-ppm s	Cr-ppm s	Cu-ppm s	La-ppm s	Mo-ppm s	Nb-ppm s	Ni-ppm s
J72R1010	200	200	3	N	<20	20	300	100	N	15	N	150
J72R1030	200	300	2	N	<20	20	200	100	N	15	N	150
J72R1070	200	200	3	N	N	20	150	100	N	10	N	100
J72R1110	200	300	3	N	<20	15	200	70	30	15	N	70
J72R1130	200	500	3	N	N	15	150	30	30	N	N	30
J72R1160	100	300	2	N	N	20	100	50	20	5	N	50
J72R1190	150	300	3	N	N	20	100	50	50	<5	N	50
J72R1230	150	300	3	N	N	20	100	20	50	<5	N	50
J72R1270	150	300	3	N	N	20	100	20	50	N	N	50
J72R1290	150	500	2	N	N	20	100	30	50	N	N	50
J72R1320	150	200	3	N	N	15	100	20	50	N	N	50
J72R1360	150	300	3	N	N	20	100	20	50	N	N	50
J72R1390	150	300	3	N	N	20	100	30	70	N	N	50
J72R1410	150	300	3	N	N	20	100	20	50	N	N	70
J72R1430	200	300	3	N	N	20	150	20	50	N	N	70
J72R1460	150	200	3	N	N	20	150	20	50	N	N	50
J72R1500	200	200	1.5	N	N	15	100	20	30	N	N	30
J72R1530	200	200	2	N	N	10	100	20	30	N	N	50
J72R1560	200	200	1	N	N	10	70	15	30	N	N	30
J72R1610	150	150	1	N	N	10	70	7	20	<5	N	50
J72R1660	150	50	N	N	N	5	10	20	N	N	N	15
J72R1720	150	100	1	N	N	7	20	10	20	N	N	20
J72R1760	200	200	2	N	N	15	70	15	30	<5	N	50
J72R1770	150	200	3	N	N	20	100	50	30	30	N	50

TABLE 2--SPECTROGRAPHIC ANALYSES OF INSOLUBLE-RESIDUE SAMPLES FROM DRILL HOLE NO. 72, JOPLIN 1 x 2 QUADRANGLE, MISSOURI AND KANSAS.--Continued

Sample	Pb-ppm s	Sb-ppm s	Sc-ppm s	Sn-ppm s	Sr-ppm s	V-ppm s	W-ppm s	Y-ppm s	Zn-ppm s	Zr-ppm s	Th-ppm s	Form#
J72R1010	30	N	10	N	100	300	N	15	300	100	N	20
J72R1030	10	N	10	N	150	300	50	15	300	200	N	20
J72R1070	15	N	10	N	150	300	N	15	N	150	N	20
J72R1110	20	N	10	N	200	200	N	20	1,000	200	N	20
J72R1130	10	N	20	N	200	200	N	30	300	150	N	20
J72R1160	10	N	15	N	150	200	N	20	200	150	N	20
J72R1190	20	N	15	N	200	200	N	20	N	200	N	20
J72R1230	10	N	15	N	200	200	N	20	N	300	N	20
J72R1270	<10	N	15	N	200	300	N	30	N	200	N	20
J72R1290	15	N	15	N	200	200	N	30	N	200	N	20
J72R1320	<10	N	15	N	200	200	N	20	200	150	N	20
J72R1360	10	N	15	N	200	200	N	20	<200	100	N	20
J72R1390	20	N	20	N	200	200	N	30	N	200	N	20
J72R1410	30	N	15	N	200	200	N	30	500	150	N	20
J72R1430	10	N	15	N	200	200	N	30	500	150	N	20
J72R1460	30	N	15	N	150	200	N	30	<200	150	N	20
J72R1500	30	N	10	N	150	150	N	20	200	150	N	40
J72R1530	10	N	5	N	100	70	N	10	300	100	N	40
J72R1560	10	N	5	N	150	70	N	15	200	100	N	40
J72R1610	<10	N	5	N	100	70	N	<10	300	100	N	40
J72R1660	N	N	N	N	100	20	N	N	N	30	N	40
J72R1720	<10	N	<5	N	100	50	N	<10	N	70	N	40
J72R1760	10	N	10	N	150	100	N	20	N	150	N	40
J72R1770	30	N	15	N	100	200	N	20	N	200	N	31

TABLE 3--SPECTROGRAPHIC ANALYSES OF INSOLUBLE-RESIDUE SAMPLES FROM DRILL HOLE NO. 73, JOPLIN 1 x 2 QUADRANGLE, MISSOURI AND KANSAS.

[N, not detected; <, detected but below the limit of determination shown; >, determined to be greater than the value shown.]

Sample	Latitude	Longitude	Fe-pct. s	Mg-pct. s	Ca-pct. s	Ti-pct. s	Mn-ppm s	Ag-ppm s	As-ppm s	Au-ppm s
J73R0435	37 5 43	95 8 58	7	.2	.05	.5	150	N	N	N
J73R0456	37 5 43	95 8 58	1	.02	.1	.02	50	N	N	N
J73R0480	37 5 43	95 8 58	.2	.02	.1	.015	10	N	N	N
J73R0516	37 5 43	95 8 58	.7	.1	.15	.1	20	N	N	N
J73R0530	37 5 43	95 8 58	.2	.02	.15	.03	15	N	N	N
J73R0572	37 5 43	95 8 58	.1	<.02	<.05	.005	<10	N	N	N
J73R0595	37 5 43	95 8 58	.1	<.02	<.05	.01	<10	N	N	N
J73R0615	37 5 43	95 8 58	.05	<.02	<.05	.015	<10	N	N	N
J73R0636	37 5 43	95 8 58	.05	<.02	<.05	.007	<10	N	N	N
J73R0657	37 5 43	95 8 58	.07	.02	<.05	.01	10	N	N	N
J73R0677	37 5 43	95 8 58	.1	.02	<.05	.02	10	N	N	N
J73R0707	37 5 43	95 8 58	.15	.02	.05	.03	15	N	N	N
J73R0740	37 5 43	95 8 58	.7	.07	.1	.05	50	N	N	N
J73R0744	37 5 43	95 8 58	10	.7	.1	.7	100	N	N	N
J73R0755	37 5 43	95 8 58	7	.5	.15	.5	70	N	N	N
J73R0787	37 5 43	95 8 58	.7	.07	.1	.05	10	N	N	N
J73R0810	37 5 43	95 8 58	.2	.05	.05	.03	<10	N	N	N
J73R0848	37 5 43	95 8 58	1	.03	.05	.02	10	N	N	N
J73R0882	37 5 43	95 8 58	1.5	.03	.05	.02	10	N	N	N
J73R0912	37 5 43	95 8 58	1.5	.03	.05	.03	10	N	N	N
J73R0957	37 5 43	95 8 58	.7	.03	.05	.02	<10	N	N	N
J73R1002	37 5 43	95 8 58	.5	.02	.05	.02	<10	N	N	N
J73R1065	37 5 43	95 8 58	.5	.02	.05	.015	<10	N	N	N

TABLE 3--SPECTROGRAPHIC ANALYSES OF INSOLUBLE-RESIDUE SAMPLES FROM DRILL HOLE NO. 73, JOPLIN 1 x 2 QUADRANGLE, MISSOURI AND KANSAS.--Continued

Sample	B-ppm s	Ba-ppm s	Be-ppm s	Bi-ppm s	Cd-ppm s	Co-ppm s	Cr-ppm s	Cu-ppm s	La-ppm s	Mo-ppm s	Nb-ppm s	Ni-ppm s
J73R0435	70	100	1	N	N	10	50	20	N	N	N	50
J73R0456	70	50	N	N	N	N	N	<5	N	N	N	5
J73R0480	50	30	N	N	N	N	N	<5	N	N	N	5
J73R0516	50	50	1	N	N	N	10	7	N	7	N	15
J73R0530	70	30	N	N	N	N	N	<5	N	N	N	N
J73R0572	70	20	N	N	N	N	N	N	N	N	N	N
J73R0595	50	30	N	N	N	N	N	<5	N	N	N	N
J73R0615	50	30	N	N	N	N	N	N	N	N	N	N
J73R0636	50	20	N	N	N	N	N	<5	N	N	N	N
J73R0657	50	30	N	N	N	N	N	<5	N	N	N	N
J73R0677	50	30	N	N	N	N	N	<5	N	N	N	N
J73R0707	50	50	N	N	N	N	N	<5	N	N	N	N
J73R0740	50	50	N	N	N	N	N	5	N	<5	N	20
J73R0744	150	150	3	N	N	30	100	150	N	N	N	300
J73R0755	150	200	5	N	N	30	70	200	20	15	N	100
J73R0787	50	100	N	N	N	N	N	10	N	N	N	5
J73R0810	50	70	N	N	N	N	N	<5	N	N	N	N
J73R0848	50	100	N	N	N	N	N	50	N	N	N	N
J73R0882	50	70	N	N	N	N	N	15	N	N	N	N
J73R0912	50	100	N	N	N	N	N	50	N	N	N	N
J73R0957	50	70	N	N	N	N	N	5	N	N	N	N
J73R1002	50	100	N	N	N	N	N	10	N	N	N	N
J73R1065	50	50	N	N	N	N	N	<5	N	N	N	N

TABLE 3--SPECTROGRAPHIC ANALYSES OF INSOLUBLE-RESIDUE SAMPLES FROM DRILL HOLE NO. 73, JOPLIN 1 x 2 QUADRANGLE, MISSOURI AND KANSAS.--Continued

Sample	Pb-ppm s	Sb-ppm s	Sc-ppm s	Sn-ppm s	Sr-ppm s	V-ppm s	W-ppm s	Y-ppm s	Zn-ppm s	Zr-ppm s	Th-ppm s	Form#
J73R0435	N	N	7	N	100	50	N	20	500	150	N	40
J73R0456	N	N	N	N	N	N	N	N	N	20	N	40
J73R0480	N	N	N	N	N	N	N	N	N	10	N	40
J73R0516	N	N	N	N	N	30	N	N	N	50	N	40
J73R0530	N	N	N	N	N	N	N	N	N	N	N	40
J73R0572	N	N	N	N	N	N	N	N	N	N	N	40
J73R0595	N	N	N	N	N	N	N	N	N	N	N	40
J73R0615	N	N	N	N	N	N	N	N	N	N	N	40
J73R0636	N	N	N	N	N	N	N	N	N	N	N	40
J73R0657	N	N	N	N	N	N	N	N	N	N	N	40
J73R0677	N	N	N	N	N	N	N	N	N	N	N	40
J73R0707	N	N	N	N	N	10	N	N	N	10	N	40
J73R0740	N	N	N	N	N	20	N	N	N	30	N	40
J73R0744	30	N	7	N	N	150	N	15	N	100	N	40
J73R0755	20	N	10	N	N	200	N	20	1,000	200	N	31
J73R0787	N	N	N	N	N	<10	N	N	N	20	N	60
J73R0810	N	N	N	N	N	N	N	N	N	50	N	60
J73R0848	N	N	N	N	N	N	N	N	N	10	N	60
J73R0882	N	N	N	N	N	N	N	N	N	15	N	60
J73R0912	N	N	N	N	N	N	N	N	N	10	N	60
J73R0957	N	N	N	N	N	N	N	N	N	10	N	60
J73R1002	N	N	N	N	N	N	N	N	N	15	N	60
J73R1065	N	N	N	N	N	N	N	N	N	10	N	60

TABLE 4--SPECTROGRAPHIC ANALYSES OF INSOLUBLE-RESIDUE SAMPLES FROM DRILL HOLE NO. 74, JOPLIN 1 x 2 QUADRANGLE, MISSOURI AND KANSAS.

[N, not detected; <, detected but below the limit of determination shown; >, determined to be greater than the value shown.]

Sample	Latitude	Longitude	Fe-pct. s	Mg-pct. s	Ca-pct. s	Ti-pct. s	Mn-ppm s	Ag-ppm s	As-ppm s	Au-ppm s
J74R0777	37 14 27	95 18 39	1.5	.1	<.05	.1	30	N	N	N
J74R0790	37 14 27	95 18 39	.3	.05	.05	.07	10	N	N	N
J74R0800	37 14 27	95 18 39	.5	.02	.05	.05	10	N	N	N
J74R0810	37 14 27	95 18 39	.15	.03	.05	.03	<10	N	N	N
J74R0830	37 14 27	95 18 39	.1	.02	<.05	.007	<10	N	N	N
J74R0850	37 14 27	95 18 39	.1	<.02	<.05	.005	N	N	N	N
J74R0895	37 14 27	95 18 39	.1	.02	<.05	.01	10	N	N	N
J74R0920	37 14 27	95 18 39	.2	.03	<.05	.05	15	N	N	N
J74R0940	37 14 27	95 18 39	.1	.02	<.05	.02	15	N	N	N
J74R0960	37 14 27	95 18 39	.2	.03	.07	.03	20	N	N	N
J74R1000	37 14 27	95 18 39	.7	.05	.07	.05	30	N	N	N
J74R1020	37 14 27	95 18 39	2	.07	.07	.1	50	N	N	N
J74R1050	37 14 27	95 18 39	10	.5	.05	.2	100	1	N	N
J74R1130	37 14 27	95 18 39	2	.07	.07	.05	30	N	N	N
J74R1140	37 14 27	95 18 39	5	.05	.05	.03	20	N	N	N
J74R1155	37 14 27	95 18 39	2	.5	.5	.07	20	N	N	N
J74R1180	37 14 27	95 18 39	1	.1	.05	.05	20	N	N	N
J74R1215	37 14 27	95 18 39	.5	.3	.5	.03	15	N	N	N

Sample	B-ppm s	Ba-ppm s	Be-ppm s	Bi-ppm s	Cd-ppm s	Co-ppm s	Cr-ppm s	Cu-ppm s	La-ppm s	Mo-ppm s	Nb-ppm s	Ni-ppm s
J74R0777	50	50	N	N	N	N	20	5	N	N	N	10
J74R0790	30	50	N	N	N	N	N	5	N	10	N	15
J74R0800	30	70	N	N	N	N	N	5	N	N	N	10
J74R0810	50	50	N	N	N	N	N	<5	N	N	N	5
J74R0830	30	20	N	N	N	N	N	N	N	N	N	<5
J74R0850	50	30	N	N	N	N	N	N	N	N	N	<5
J74R0895	50	30	N	N	N	N	N	<5	N	N	N	<5
J74R0920	50	50	N	N	N	N	N	7	N	N	N	5
J74R0940	50	50	N	N	N	N	N	<5	N	N	N	5
J74R0960	50	200	N	N	N	N	N	<5	N	N	N	15
J74R1000	50	50	N	N	N	10	10	7	N	N	N	50
J74R1020	50	100	N	N	N	10	15	15	N	N	N	150
J74R1050	100	200	5	N	N	30	70	100	50	20	N	100
J74R1130	50	70	N	N	N	N	N	20	N	7	N	10
J74R1140	50	70	N	N	N	N	N	200	N	7	N	20
J74R1155	70	70	N	N	N	N	N	20	N	N	N	10
J74R1180	50	100	N	N	N	N	N	10	N	N	N	15
J74R1215	50	50	N	N	N	N	N	<5	N	N	N	5

TABLE 4--SPECTROGRAPHIC ANALYSES OF INSOLUBLE-RESIDUE SAMPLES FROM DRILL HOLE NO. 74, JOPLIN 1 x 2 QUADRANGLE, MISSOURI AND KANSAS.--Continued

Sample	Pb-ppm s	Sb-ppm s	Sc-ppm s	Sn-ppm s	Sr-ppm s	V-ppm s	W-ppm s	Y-ppm s	Zn-ppm s	Zr-ppm s	Th-ppm s	Form#
J74R0777	N	N	N	N	N	20	N	10	200	100	N	40
J74R0790	N	N	N	N	N	15	N	N	200	30	N	40
J74R0800	N	N	N	N	N	<10	N	N	N	30	N	40
J74R0810	N	N	N	N	N	<10	N	N	N	20	N	40
J74R0830	N	N	N	N	N	N	N	N	N	N	N	40
J74R0850	N	N	N	N	N	N	N	N	N	N	N	40
J74R0895	N	N	N	N	N	N	N	N	N	N	N	40
J74R0920	N	N	N	N	N	15	N	N	N	30	N	40
J74R0940	N	N	N	N	N	N	N	N	N	15	N	40
J74R0960	N	N	N	N	N	10	N	N	N	20	N	40
J74R1000	N	N	N	N	N	30	N	N	N	30	N	40
J74R1020	N	N	5	N	N	30	N	10	N	50	N	40
J74R1050	50	N	10	N	N	100	N	20	N	150	N	31
J74R1130	N	N	N	N	N	20	N	N	N	30	N	78
J74R1140	N	N	N	N	N	<10	N	N	N	20	N	78
J74R1155	N	N	N	N	N	20	N	N	N	30	N	78
J74R1180	10	N	N	N	N	20	N	N	N	50	N	78
J74R1215	N	N	N	N	N	N	N	N	N	10	N	78